REMARKS

Claims 25 through 34 are now presented for examination. Claim 25 has been amended to define still more clearly what Applicants regard as their invention, in terms which distinguish over the art of record. Claims 25 is the only independent claim.

Claims 25-34 have been rejected under 35 U.S.C. § 102 as being anticipated by or, in the alternative, have been rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,898,501 (Suzuki et al). With regard to the claims as currently amended, these rejections are respectfully traversed.

Independent Claim 25 as currently amended is directed to projection exposure apparatus in which an illumination optical system illuminates a pattern of a first object using exposure light from an exposure light source. A projection optical system directs the exposure light emitted from the pattern onto a second object. An interferometer measures an optical characteristic of the projection optical system on the basis of an interference fringe produced through interference caused between light emitted from the projection optical system toward the second object side and reference light. A light receiving portion of the interferometer that receives light emitted toward the second object side is provided on a movable stage which carries the second object thereon.

In Applicants' view Suzuki et al. discloses an arrangement that measures wavefront aberrations of microlithography projection lenses such as i-line or excimer laser projection lenses. In the apparatus, an argon-ion laser irradiates a Fizeau surface that reflects reference light and transmits test light. The test light is reflected by a spherical reflecting surface to pass twice through the test lens and the Fizeau surface to interfere with the reference light. A piezoelectric

element changes the fringes slightly. An image-pickup device receives the interference fringes and outputs data to a processor that calculates corresponding wavefront aberrations of the test lens. For testing an i-line lens, the argon laser can be a single-mode, 363.8 nm laser. For testing a lens used with a KrF excimer laser, the argon laser can emit second-harmonic light at 248.25 nm.

According to the invention defined in Claim 25 as currently amended, an interferometer measures an optical characteristic of a projection optical system that directs exposure light emitted from a pattern onto a second object on the basis of an interference fringe produced through interference between light emitted from the projection from the projection optical system toward a second object and reference light. The light receiving portion of the interferometer for receiving light emitted toward the second object side is provided on a movable stage which carries the second object (e.g., a Si wafer).

Suzuki et al. may teach an interferometer arranged to cause interference between light emitted toward a reticle side of a projection optical system and reference light. The light receiving portion of the Suzuki et al. interferometer, however, is not provided on a movable stage carrying a second object. As a result, it is not seen that Suzuki et al.'s interferometer arrangement in any manner teaches or suggests the feature of Claim 25 of a light receiving portion of an interferometer (measuring an optical characteristic of a projection optical system from an interference fringe between light from the projection optical system toward a second object and a reference light) that receives light emitted toward the second object side is provided on a movable stage which carries the second object thereon. Accordingly, it is believed that Claim 25 as currently amended is completely distinguished from Suzuki et al. and is allowable thereover.

Claims 25-34 also have been rejected under 35 U.S.C. § 103 as being unpatentable over Suzuki et al. view of U.S. Patent No. 5,995,263 (Tokuda et al.). With regard to the claims as currently amended, this rejection is respectfully traversed.

In Applicants' opinion, Tokuda et al. discloses a scan type projection exposure apparatus in which an illumination optical system forms a slit-shaped illumination area on a pattern on a mask by using illuminating light. A projection optical system that forms an image of a portion of the pattern in the illumination area on a substrate includes a mask stage which moves at least in one direction while holding the mask. A substrate stage moves two-dimensionally while holding the substrate. A control system synchronously scans the mask stage and the substrate stage, and an image forming performance adjusting system adjusts image forming performance of the projection optical system and has a component placed in an area through which the illuminating light incident from the illumination area on the mask to the projection optical system does not pass.

As aforementioned, it is a feature of Claim 25 as currently amended that an interferometer which measures an optical characteristic of a projection optical system that directs exposure light emitted from a pattern onto a second object on the basis of an interference fringe produced through interference between light emitted from the projection from the projection optical system toward a second object and reference light has a light receiving portion that receives light emitted toward the second object side provided on a movable stage which carries the second object. Suzuki et al. only teaches an interferometer arrangement that uses interference between light emitted toward a reticle side of a projection optical system and reference light.

Tokuda et al., as noted by the Examiner, only teaches a through the lens type optical system to evaluate a projection optical system.

With regard to the cited combination, neither Tokuda et al. nor Suzuki et al. in any manner teaches or suggests the feature of a light receiving portion of an interferometer for measuring an optical characteristic of a projection optical system is provided on a movable stage which carries the second object thereon. Accordingly, it is not seen that the through the lens optical system for evaluating a projection optical system of Tokuda et al. added to the interferometer arrangement of Suzuki et al. which is arranged to cause interference between light emitted toward a reticle side of a projection optical system and reference light suggests the features of Claim 25. It is therefore believed that Claim 25 as currently amended is completely distinguished from Suzuki et al. or any combination of Suzuki et al. and Tokuda et al. and is allowable.

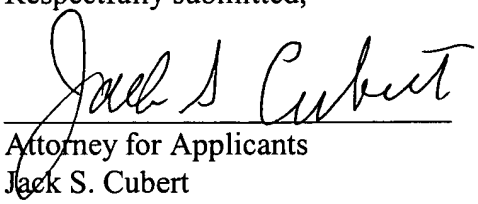
A review of the other art of record has failed to reveal anything which, in Applicants' opinion, would remedy the deficiencies of the art discussed above, as references against the independent claim herein. That claim is therefore believed patentable over the art of record.

The other claims in this application are each dependent from the independent claim discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' attorney, Steven E. Warner, may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,



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